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EXAMINER

TUGBANG, ANTHONY D

ART UNIT PAPER NUMBER

3729

DATE MAILED: 07/27/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/707,896

Applicant(s)

GAMBINO ET AL.

Examiner

A. Dexter Tugbang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 10 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) 6-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/22/04 & 1/26/04.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of the invention of Species A, Claims 2-5, in the reply filed on May 10, 2006 is acknowledged.
2. Claims 6-18 have been withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected elected, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on May 10, 2006.

Specification

3. Applicant is reminded of the proper language and format for an abstract of the disclosure.

The abstract should be in narrative form and generally limited to a single paragraph on a separate sheet within the range of 50 to 150 words. It is important that the abstract not exceed 150 words in length since the space provided for the abstract on the computer tape used by the printer is limited. The form and legal phraseology often used in patent claims, such as "means" and "said," should be avoided. The abstract should describe the disclosure sufficiently to assist readers in deciding whether there is a need for consulting the full patent text for details.

The language should be clear and concise and should not repeat information given in the title. It should avoid using phrases which can be implied, such as, "The disclosure concerns," "The disclosure defined by this invention," "The disclosure describes," etc.

4. The abstract of the disclosure is objected to because the language includes a phrase that is already implied, i.e. "The invention provides...". Correction is required. See MPEP § 608.01(b).

5. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: A Method of Manufacturing High Performance Copper Inductors with Bond Pads.

Claim Objections

6. Claims 1 and 4 are objected to because of the following informalities.

In Claim 1, --the-- should be inserted before “last metal Cu” (line 11).

In Claim 4, “a Cu inductor” (line 1) should be replaced with --the Cu laminate inductor--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter, which the applicant regards as his invention.

8. Claims 1 through 5 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In Claim 1, it is unclear what is meant by the recitation of “last metal level beneath a bond pad level” (line 5). For example, in the applicant(s) Figures 1A and 1B, when the last metal Cu level is actually formed, there is no “bond pad” that is present or formed. The “bond pad” is formed subsequently (in applicant(s) Figure 1F). So the recitation of “last metal level beneath a bond pad level” is misleading and confusing rendering the claim as being vague and indefinite.

In Claim 5, it is unclear what is meant by the phrase of “the structure of step f” (line 2). In step f (lines 15-16 of Claim 4), there are several elements that can be referred as “the structure”, e.g. Cu seed layer, passivation layer, or Cu inductors, and it is confusing and

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misleading as to whether all of the elements, or if one of the elements, are being referred to as “the structure”.

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

10. Claim 1 is rejected under 35 U.S.C. 102(b) as being anticipated by Japanese Patent JP 5-347212, referred to hereinafter as JP’212.

JP’212 discloses a method of making a Cu laminate inductor comprising: forming a last metal Cu level (e.g. 12 in Fig. 8) at the last metal level, which is defined as the last metal level beneath a bond pad level (top portion of 8 in Fig. 11); forming and superposing a bar via (e.g. 22 or 13 in Fig. 8) of the Cu laminate inductor over the last metal Cu level of the Cu laminate inductor; and forming and superposing a last metal level +1 Cu level (e.g. top layer 12 in Fig. 10) of the Cu laminated inductor at the last metal +1 level over the bar via and the last metal Cu level, to form the Cu laminate inductor.

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

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having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP'212 in view of Ting 5,300,461.

JP'212 discloses the claimed manufacturing method as relied upon in Claim 1 above.

JP'212 does not teach forming a passivation layer over the last metal +1 Cu level of the Cu laminate inductor.

Ting shows that it is conventional to form a passivation layer (e.g. 40 in Fig. 5) over a last metal +1 level and a last metal level, including a bar via, to seal the device and provide excellent moisture resistant qualities (col. 8, lines 26-44).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the method of JP'212 by forming the passivation layer, as taught by Ting, to advantageously provide a sealed Cu laminate inductor with excellent moisture resistant qualities.

13. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over JP'212 in view of Ting, as applied to claims 1 and 2 above, and further in view of Barth et al 6,730,982.

JP'212, as modified by Ting, discloses the claimed manufacturing method as relied upon in Claims 1 and 2 above. The modified JP'212 method does not teach that the passivation layer is made of CoWP.

Barth teaches that passivation layers can be of a CoWP composition of material that allows easier probing and wire bonding (col. 4, lines 9-34)

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It would have been obvious to one of ordinary skill in the art at the time the invention was made to have substituted the CoWP material of Barth, for the passivation layer material of JP'212, to include the added benefit of easier probing and wire bonding.

Allowable Subject Matter

14. Claims 4 and 5 would be allowable if rewritten to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action and to include all of the limitations of the base claim and any intervening claims.

Conclusion

15. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to A. Dexter Tugbang whose telephone number is 571-272-4570. The examiner can normally be reached on Monday - Friday 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on 571-272-4690. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



A. Dexter Tugbang
Primary Examiner
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July 20, 2006